REMARKS

REJECTION UNDER 35 U.S.C. §103

The rejection of Claims 1-3, 5-19, 21-29 and 31-33 under 35 U.S.C. 103(a) as unpatentable over Brown et al. (US 5,807,522) and Tisone et al. (US 6,063,339) has been maintained.

The subject application claims methods for fabricating an array. To illustrate the elements of the invention, independent Claim 1 of the application is discussed in detail below. This analysis also holds for independent claims 6 and 25.

Claim 1 claims an array fabrication method which uses:

- a head system with multiple groups of drop dispensers;
- a transport system to move the head system with respect to a substrate; and
- a processor to dispense droplets from dispensers during operation of the transport system, in a pattern along a selected path for each group.

The claimed method of fabrication an array includes the steps of:

- (step a) loading the dispensers with fluid such that each dispenser group has at least one set of redundant dispensers loaded with a same fluid;
- (step b) dispensing drops from the dispensers to identify an error in one or more dispensers;
- (step c) moving a first dispenser of each set in each group along the selected path for that group while dispensing drops from non-error first dispensers of the sets in at least part of the pattern along the selected path for each group;
- (step d) moving a second dispenser of the sets in each group along the selected path for that group while dispensing drops from a non-error second dispenser of a set having an identified error first dispenser, in at least part of the pattern for the selected path of the first group; and
- (step e) repeating (step a) through (step d) at least once.

The Applicants submit that at least the underlined sections above are not taught or suggested by the references cited by the Examiner.

To clarify the claimed array fabrication method, a representative embodiment is described below. The head system claimed contains multiple dispensers configured (again, in an exemplary fashion) as shown in Figure 4A of the subject specification. For clarity, Figure 4A has been reproduced and below with additional annotation (specifically, a *Group* [in the rectangle] and a *Set* [in the oval] of dispensers are indicated).

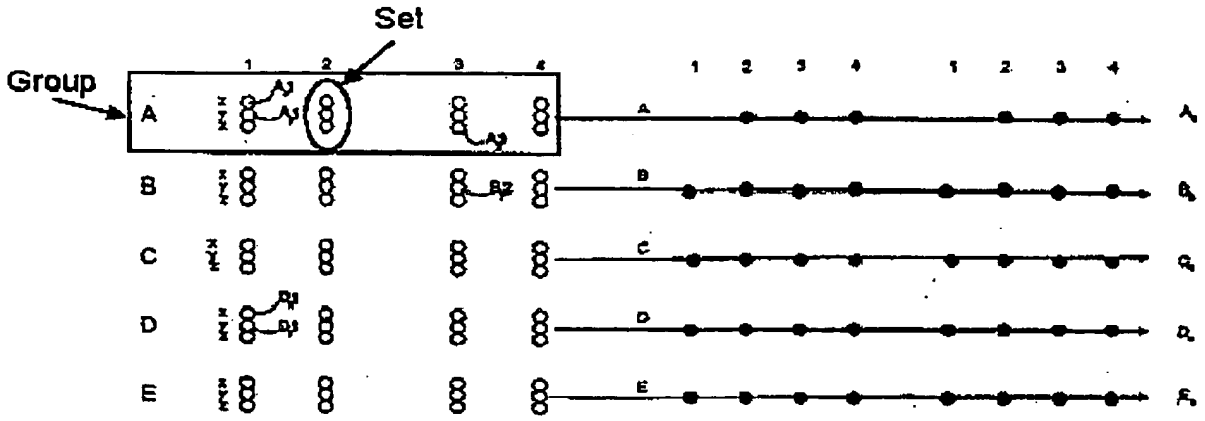

FIG. 4A

As shown above and described in the specification, the head systems claimed in the subject application have multiple *Groups* of dispensers (i.e., at least two). Each *Group* of dispensers of the claimed head system (e.g., Group A [in the rectangle]) contains at least one *Set* of dispensers, with each *Set* containing multiple dispensers (e.g., dispensers Ax2, Ay2 and Az2 make up *Set* A2 [in the oval]). As will be clear from the discussion below, a head configuration of this layout is required to carry out the claimed array fabrication methods.

As recited in the claimed methods, the dispensers are loaded such that each *Set* of dispensers contains the same fluid (step *a*), the dispensers are tested to identify dispenser errors (step *b*), and the head system is moved such that a first dispenser of each set (e.g., dispensers in row y of the *Sets*) travels along the selected path (the black lines on the right of Figure 4A indicate the selected path) while depositing drops from the non-error dispensers (step *c*). The deposition of drops is depicted in Figure 4A on the right, with black dots representing deposited drops from specific dispensers of the head system. As can be seen in this example, dispenser Ay1 did not dispense a drop at its intended location (i.e., position A1 on the right) because it is an error dispenser. In step *d* of the claimed methods, a second non-error dispenser from the *Sets* in each *Group* is moved along the same selected path (e.g., the dispensers in row x of the *Sets* would follow the selected path) and dispenses drops where one was not deposited by an error dispenser of the same *Set* (e.g., dispenser Ax1 deposits a drop where error dispenser Ay1 failed to do so). In step *e* of the claimed methods, steps *a* to *d* are repeated as necessary to fabricate the array.

As is clear from the above description, this method of fabricating an array utilizes redundant dispensers (i.e., *Sets* of dispensers) in such a way that a drop that was not deposited by a first

defective (or error) dispenser of a *Set* is deposited by a second (or third) non defective (or non-error) dispenser of the same *Set*. The claimed configuration of dispensers makes the claimed method possible.

In maintaining the rejection of the pending claims, the Examiner asserts that Brown et al. disclose each of the elements of the claimed invention except error detection and that Tisone et al. remedies this deficiency. The Applicants respectfully disagree with the Examiner's interpretation of the teachings of Brown et al. and Tisone et al. and submit that the combination of these references fails to teach or suggest numerous elements of the claimed invention (as underlined above).

The Examiner asserts that Brown et al. disclose a method for array fabrication that utilizes a dispensing device that contains a plurality of dispensers, the method including the steps of loading the dispensers with a reagent solution, moving the dispensers to a selected position to dispense the solution, and repeating the process to fabricate an array. In asserting that Brown et al. disclose dispensers as claimed in the subject application, the Examiner cites col. 4 lines 12 to 15 which reads:

> The dispensing device in the apparatus may be one of a plurality of such devices which are carried on the arm for dispensing different analyte assay reagents at selected spaced array positions.

As is clearly evident, this brief passage, and indeed the entirety of Brown et al., fails to teach or suggest the configuration of dispensers as claimed. Specifically, Brown et al. fail to disclose a head system containing multiple *Groups* of dispensers with each *Group* containing at least one *Set* of dispensers as detailed above (see Figure 4A). As stated previously, without the dispensers configured in this way, it is not possible to perform the array fabrication method as claimed. Indeed, without having such a configuration of dispensers it is impossible to complete even the first step of the claimed array fabrication method (in which the dispensers are loaded such that the dispensers in each *Set* contain the same fluid) because Brown et al. fail to teach or suggest *any* specific dispenser configuration, let alone in the form of multiple *Groups* containing at least one *Set* of dispensers. In fact, Brown et al. fail to teach or suggest loading *any* two dispensers with the same reagent solution. In the passage cited above, Brown et al. specifically state that *different* dispensing heads are loaded with *different* reagents. The additional passages cited by the Examiner that assertedly disclose loading different dispensers with the same fluid (i.e., col. 3 lines 46-50 and col. 7 lines 55-59) merely recite steps by which a *single* dispenser can be loaded (or washed and re-loaded) with a reagent solution. Therefore, the Applicants submit there is no teaching in Brown et al. of loading different dispensers with the same fluid.

Furthermore, as acknowledged by the Examiner, Brown et al. fail to disclose any error identification step. Without this teaching, it is impossible for Brown et al. to disclose any of the

remaining steps. Specifically, Brown et al. fail to disclose dispensing drops from non-error dispensers from a first dispenser of each *Set* because 1) Brown et al. provide no means through which an error or a non-error dispenser can be identified, and 2) no dispenser *Sets* as claimed are disclosed. It is likewise impossible for Brown et al. to disclose the remaining steps of the array fabrication method because 1) there is no way to determine where drops were not deposited by error dispensers, and 2) no second dispensers of each *Set* are disclosed which can deposit drops at these locations.

Again, the Applicants submit that without disclosing the configuration of dispensers as is claimed, Brown et al. simply cannot disclose any of the steps of the array fabrication method claimed.

To remedy the deficiencies of Brown et al., the Examiner cites Tisone et al. for its asserted teaching of a dispenser error identification method. The Examiner also asserts that Tisone et al. discloses multiple dispensers as is claimed.

As detailed above, Brown et al. is fundamentally deficient in teaching a head system containing multiple *Groups* of dispensers each of which contains at least one *Set* of dispensers as is claimed in the subject methods (see Figure 4A above). In asserting that Tisone et al. discloses multiple dispensers, the Examiner cites col. 7 lines 61-67 which reads:

> It bears noting also that while only a single dispensing head 128 is shown, it is contemplated that multiple dispensing heads in linear or two-dimensional arrays can also be used with equal or improved efficacy. These may be provided and operated either in parallel as illustrated in FIG. 2 (ie. for multi-gang operation) or in another coordinated fashion, as desired.

The Applicants submit that this passage fails to teach or suggest the dispenser configuration as claimed. There is no mention of configuring the dispensers of a head system in multiple *Groups* with each *Group* containing at lest one *Set* of dispensers. As detailed above, without a teaching of configuring dispensers as is claimed, it is impossible to perform any of the steps of the claimed array fabrication method.

Furthermore, there is no teaching in Tisone et al. of filling different dispensers with the same fluid, let alone filling the dispensers such that each dispenser of a *Set* contains the same fluid. Indeed, as mentioned above, Tisone et al. fails even to disclose *Sets* or *Groups* of dispensers as claimed.

As indicated above and stated by the Examiner, Brown et al. fail to teach dispenser error identification. To remedy this fundamental deficiency the Examiner cites Tisone et al. As stated in the previous response, the error identification method disclosed in Tisone et al. is directed to controlling specific parameters of valve deposition (e.g., timing) and does not teach identifying an

error dispenser and dispensing only from non-error dispensers during array fabrication as is claimed. Rather, the deposition error method of Tisone et al. evaluates whether a drop is deposited in the desired location and if it is not, adjustments are made to the parameters of valve deposition to correct it. In other words, there is no such thing as an "error dispenser" as claimed in the subject application. If a dispenser deposits erroneously, the method disclosed in Tisone et al. adjusts the parameters of dispensation and deposits fluid using the *same* dispenser. In contrast, the method of the claimed invention does not use the "error dispenser" but rather dispenses fluid from a *second* dispenser selected from the same *Set* as the error dispenser. In other words, the claimed method includes the step of depositing a drop from a *second* dispenser of a *Set* (which is loaded with the same fluid) where a *first* dispenser of the same *Set* failed to deposit a drop because it was identified as an "error dispenser" and therefore not used. The Applicants submit that Tisone et al. fails to teach or suggest this element of the claimed invention.

Therefore, the Applicants submit that the combination of Brown et al. and Tisone et al. fails to teach or suggest each and every element of the claimed invention. Specifically, these references fail to teach or suggest:

- a head system containing multiple *Groups* of dispensers each containing at least one *Set* of dispensers;
- that dispensers of a *Set* are filled with the same fluid (or reagent);
- depositing drops only from non-error dispensers; and
- using a second non-error dispenser of a *Set* to deposit a drop where a first error dispenser of the same *Set* failed to do so.

Because the combined teachings of Brown et al. and Tisone et al. fail to teach or suggest each and every element of the claimed invention, the Applicants submit that a *prima facie* case of obviousness has not been established. As such, the Applicants respectfully request that this rejection be withdrawn.

Claims 4, 20 and 30 are rejected under 35 U.S.C. 103(a) as unpatentable over Brown et al. (US 5,807,522) and Tisone et al. (US 6,063,339) and further in view of Gamble et al. (US 5,958,342).

In making this rejection, the Examiner asserts that Gamble et al. remedies the deficiencies in the teachings of Brown et al. and Tisone et al. because they disclose using pulse jet dispensers to distribute arrays of microspots.

However, as detailed above, the combined teachings of Brown et al. and Tisone et al. fail to teach or suggest numerous elements of the independent claims of the subject application (see bullet

points above). The Applicants submit that Gamble et al. fail to remedy *any* of these fundamental deficiencies in the teachings of Brown et al. and Tisone et al. Indeed, the Examiner cited Gamble et al. merely for its teaching of pulse-jet dispensers to distribute arrays of microspots.

Because the combined teachings of Brown et al., Tisone et al. and Gamble et al. fail to teach or suggest each and every element of the claimed invention, the Applicants submit that a *prima facie* case of obviousness has not been established. As such, the Applicants respectfully request that this rejection be withdrawn.

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CONCLUSION

In view of the amendments and remarks above, the Applicants respectfully submit that all of the claims are in condition for allowance, which action is requested. If the Examiner finds that a telephone conference would expedite the prosecution of this application, please telephone Dianne Rees at (650) 485-5999. The Commissioner is hereby authorized to charge any fees under 37 C.F.R. §§ 1.16 and 1.17 which may be required by this paper, or to credit any overpayment, to Deposit Account No. 50-1078, order number 10010464-1.

Respectfully submitted,

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